

AIM AT 2030

Artificial Intelligence Mission Austria 2030

Shaping the Future of Artificial Intelligence in Austria

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Artificial intelligence changes all of our lives

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Artificial intelligence (AI) comprises computer systems that exhibit intelligent behavior. AI can help to improve all our lives. Already today, there are impressive applications such as in automatic translation. But we are only at the beginning of development: many more innovations are expected for the future.

What is possible today, what is being done?

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Systems based on artificial intelligence analyze their environment and act autonomously to achieve certain goals. They function using rule knowledge created by experts or on the basis of statistical models derived from data (machine learning or deep learning). AI includes both pure software systems that perform actions in virtual environments and hardware such as robots.

The areas of application of AI are diverse. They range from systems that understand human language (e.g. automatic translators) to programs that analyze visual information (e.g. in autonomous driving), search engines, and systems that draw conclusions from data. These also include assistance and advisory programs or autonomous robots and vehicles. AI systems are often an integrated part of other technical systems, e.g. in cars.

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The application areas of AI are manifold. They range from systems that understand human language (such as automatic translators) to programs that analyze visual information (for example, in autonomous driving), search engines, to systems that derive conclusions from data. This also includes assistance and consulting programs or autonomous robots and vehicles. Frequently, AI systems are an integral part of other technical systems, eg in the car.



PERCEIVE Perception

- 3Machine Vision
Machine vision
- 3audio processing
audio processing

3sensor technology
sensors



UNDERSTAND Understanding

- 3Natural Language
Natural language
- 3analyzing texts
text analysis
- 3translating and interpreting
Translation and interpretation
- 3Learning from Data
Learning from data



ACT Action

- 3search/optimization
Search / Optimization
- 3prepare decisions
Prepare decisions
- 3Autonomous behavior
Autonomous behavior
- 3make predictions
Making predictions

AI includes methods that enable machines to perceive their environment in a similar way to humans, understand situations and take actions in the environment.

AI includes methods that enable machines to interpret their environment in a similar way to humans, to understand situations, and to act in the environment.

Application areas of AI

Application areas of AI

AI systems have become much more powerful in recent years: due to increasing digitalization (miniaturization, sensors, networking), the availability of data has increased significantly.

At the same time, the costs of data storage and computing power have fallen sharply. In addition, there are now a number of robust and therefore relatively easy-to-use AI methods, some of which are also available as an Internet service (cloud) and are therefore easily accessible.

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At the same time, the costs of data storage and processing power have fallen dramatically. Furthermore, today there are a number of robust and therefore relatively easy-to-use AI methods, some of which are also available as an Internet service (Cloud service) and are thus easily accessible.



voice assistants
Language assistants
chatbots, information systems
Chatbots, information systems



Automatic translation
Automatic translation
text translation, spoken language
Text translation, spoken language



consulting systems
Advisory systems
Medical Support, Industrial Maintenance
Medical support, industrial maintenance



Adaptive controls
Adaptive control
Self-learning industrial plants
Self-learning industrial plants



image analysis
Image analysis
error detection in production
Error detection in production



video recognition
video detection
Action Recognition in Video Data
Action recognition in video data



games
games
Artificial game characters, gesture recognition
Artificial game characters, gesture recognition



robotic surgery
Robotic surgery
tumor removal, Orthopedic milling robots
Tumor removal, orthopedic milling robots



Learn
Learning
Intelligent learning environments
Smart tutoring systems



Autonomous driving
Autonomous driving
Self-driving transport robots, autonomous buses
Self-driving transport robots, autonomous buses

These AI innovations are being worked on

Work is underway on these AI innovations

- 3Intelligent teaching systems (smart tutoring) that adapt to the level of knowledge and needs of the learners and support and challenge them individually
- 3Fully autonomous driving for trains and Robot taxis – even in bad weather or in heavy traffic
- 3Universal translators that translate spoken language can translate
- 3AI-supported security systems for IT systems
- 3AI in the legal system, e.g. to make predictions for proceedings or analyze large portfolios of intellectual property
- 3Intelligent tutoring systems (smart tutoring), which adjust to the level of knowledge and needs of learners and individually support and challenge them
- 3Fully autonomous driving on trains and robotic taxis - even in bad weather or in heavy traffic
- 3Universal translators that can translate spoken language in real time
- 3AI-based security systems for computer systems
- 3AI in the legal field, for example forecasting of trials outcomes or analysis of large portfolios of intellectual property
- 3Computers that can interpret and respond to humans facial expressions

Austria is committed to a humane and common good-oriented Further development of artificial intelligence. Like all technologies, AI technology must be designed. We must actively face this challenge.

Austria is committed to a humane and socially acceptable development of artificial intelligence. Like all technologies, AI technology must be designed. We have to face this challenge proactively.

- 3Computers that interpret human facial expressions and be able to respond to it
- 3Seamless human-robot interaction in the production
- 3AI medical systems that help interpret X-rays and assist in the compilation of complex therapies (e.g. drug interactions).
- 3AI medical systems to support the selection of cancer therapies
- 3AI systems that consumers advise on legal decisions
- 3Seamless human-robot interaction in production
- 3AI medical systems that assist in the interpretation of radiographs and in the compilation of complex therapies (eg, drug interactions).
- 3AI medical systems to support the selection of cancer therapies
- 3AI systems that advise consumers on legal decisions

economic factor AI

Economic factor AI

AI offers a wide range of opportunities in almost all sectors of the economy. AI can help to automate the acquisition of information and prepare decisions or even make them automatically. There is enormous potential here for increasing productivity: cognitive routine activities, where rule-based decisions are repeatedly made on the basis of similarly structured data, are widespread in the economy. Typical activities include making appointments, accounting, planning tasks, inspections, insurance claims, etc.

Various observers are therefore warning of the potential negative impact of AI on employment. What is certain is that the job profile of many jobs in corporate administration, among the self-employed, and also in public administration will change significantly as a result of AI.

But AI also offers great opportunities for product innovation, especially in the service sector, where the lack of availability and scalability of expert knowledge is a major obstacle to innovation. The possibilities for developing new services based on AI are great.

AI technologies such as learning systems offer a wide range of possible applications in a number of industries. In addition to the development of new products based on AI, the application will make a significant contribution to Austria's economic dynamism. Therefore, promoting the diffusion of AI is an important political field of action.

| | | |
|--|------|---|
| production of goods | 2.3% | Manufacturing |
| Agriculture, forestry, fishing | 2.1% | Agriculture, forestry and fishing |
| financial and insurance services | 2.0% | Financial and insurance activities |
| wholesale and retail trade | 1.9% | Wholesale and retail trade |
| accommodation and gastronomy | 1.8% | Accommodation and food service activities |
| energy and water supply and disposal | 1.7% | Energy, water supply and sewerage |
| Transport and Logistics | 1.5% | Transportation and logistics |
| information and communication services | 1.4% | Information and communication services |
| Public Services | 1.4% | Public services |
| art, entertainment and recreation | 1.2% | Arts, entertainment and recreation |
| healthcare system | 1.2% | Human health activities |
| social services | 1.2% | Residential care, social activities |
| Building | 1.1% | Construction |
| Other Services | 1.0% | Other service activities |
| Education and Teaching | 0.7% | Education |

Estimate of the additional annual growth of value creation through AI at industry level until 2035 Source: VDI/VDE 2018 according to Purdy and Daugherty 2017

Additional annual growth of value added related to KI at sectoral level until 2035
Source: VDI/VDE 2018, Purdy and Daugherty 2017

AI offers many opportunities in almost all sectors of the economy. AI can help automate information gathering and prepare decisions, or even make decisions automatically. There is tremendous potential for productivity gains here: cognitive routine activities, where repeated rule-based decisions are made based on similarly structured data, are widely used in the economy. Typical activities include appointments, bookkeeping, planning tasks, inspections, insurance claims, etc.

Several observers therefore warn about possible negative impacts of AI on employment. It is certain that the job profile of many jobs in the administration of companies, of self-employed people, but also in public administration will change significantly due to AI.

However, AI also offers great opportunities for product innovation, especially in the service sector, where the lack

of availability and scalability of expertise is a major innovation barrier. The possibilities for the development of new services based on AI are great.

AI technologies such as learning systems offer a variety of applications in a variety of industries. In addition to the development of new products based on AI, their application will make a significant contribution to the economic dynamics of Austria. Therefore, promoting the diffusion of AI is an important area of politics.

AI and Ethics

AI and ethics

AI as a technology with far-reaching effects on the economy and society also touches on ethical questions. AI will significantly expand the knowledge of companies, authorities and individuals about political attitudes, financial situation and even life expectancy of individuals. The question arises as to the extent to which unequal treatment is permissible on the basis of this knowledge. A second question is the degree of autonomy we want to grant to AI-based systems. Who is responsible for the actions of these systems? These questions can only be answered in a broad social dialogue.

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AI in Austria

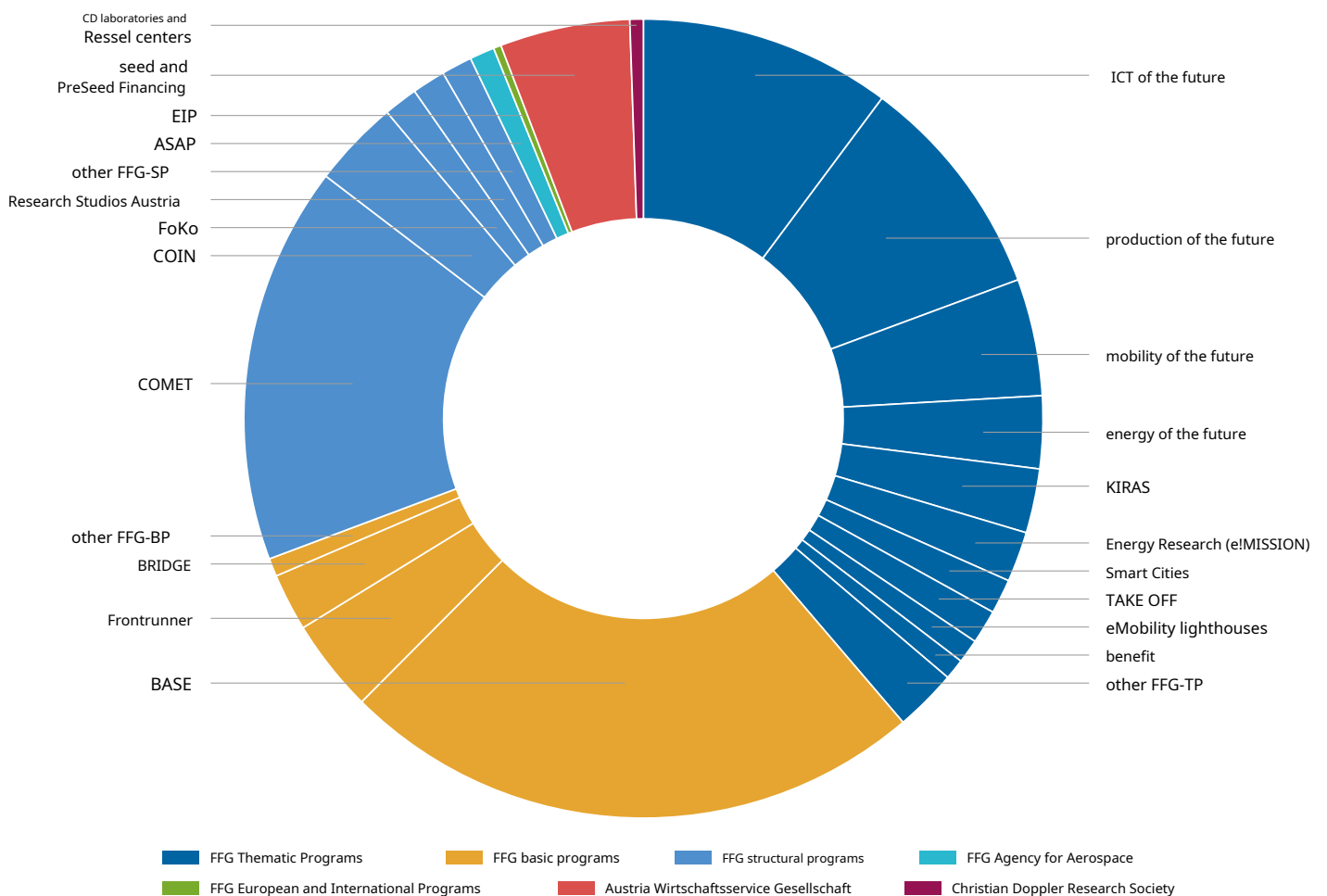
AI in Austria

Research into artificial intelligence has a very long tradition in Austria. The traditional focal points include logical systems and knowledge-based approaches, neural networks, robotics and language-understanding systems. New focal points have emerged in the field of production and Industry 4.0, e.g. for predictive maintenance. The federal government funded this research between 2012 and 2017 with a total of EUR 349.9 million.

Austrian companies have a good basis for the successful development and innovative use of AI. Manufacturing companies in particular

can benefit from the flexibility of AI systems and integrate them into Industry 4.0 systems (e.g. automotive supply industry). However, increasing digitization also offers a wide range of possible applications outside of production - from marketing and customer service to accounting. AI in the service sector is considered one of the most promising growth areas, for example in banks, insurance companies or consulting services.

Companies in Austria are both developers and users of innovative AI technologies.



Funding of AI research in federal programs between 2012 and 2017 *Public funding for AI research in federal programs between 2012 and 2017*

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Turing companies, in particular, can benefit from the flexibility of AI systems and integrate them into Industry 4.0 systems (eg, in the automotive supply industry). In addition, the increasing digitization also offers a wide range of application possibilities outside of production - from marketing and customer care to bookkeeping. AI in the services sector is one of the most promising growth areas, such as banks, insurance or consulting services.

Companies in Austria belong both to the developers and to the users of innovative AI technologies.

Examples of AI from Austria

Examples of AI from Austria



- 3Search in radiological image databases
- 3Media monitoring through automatic speech recognition
- 3Automatic document summarization and message texts
- 3Automatic detection of skin and retinal diseases
- 3Self-learning software for accounting and invoice management
- 3Automatic audit systems to improve Compliance
- 3Intelligent sales platforms for sales
- 3Expert systems for automated telephone customer service
- 3AI and language understanding as an intelligent automatic teacher for foreign languages
- 3Automatic translation
- 3Intelligent timetable planning
- 3logistics planning & optimization
- 3Electronic passport control
- 3fraud detection
- 3Automatic music classification and music recommendation
- 3Robots for textile design

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future fields for politics

Future fields for politics

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RESEARCH AND INNOVATION
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INFRASTRUCTURE FOR INDUSTRIAL LEADERSHIP POSITIONS
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QUALIFICATION AND TRAINING
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AI IN THE PUBLIC SECTOR AI
IN THE PUBLIC SECTOR

AI IN THE ECONOMY AI
IN THE ECONOMY

SOCIETY, ETHICS AND LABOR MARKET
SOCIETY, ETHICS AND LABOR MARKET

AI GOVERNANCE, SECURITY AND LAW AI
GOVERNANCE, SECURITY AND LAW



RESEARCH AND INNOVATION

Austria needs excellent AI research in order to benefit from international technological developments and to create a broad knowledge base that forms the basis for future applications. Despite the progress, there is still a great need for research into AI technologies, from basic research to many interface topics, such as AI applications in companies. AI research at Austrian universities and in companies is therefore an important field of action.

Research also plays an important role in training. Austria must be able to use AI technologies innovatively. To do this, it needs trained experts who have ideally become familiar with the state of research in AI through their own projects at universities and technical colleges. In addition to technical knowledge, these specialists should ideally also have knowledge of the economic fields of application.

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Research also plays an important role in education. Austria needs to be able to innovate using AI technologies. This requires trained experts who have ideally come to know the state of research in AI through their own projects at universities and technical colleges. In addition to technical knowledge, these professionals should ideally also have knowledge of the economic application fields.



QUALIFICATION AND TRAINING

Knowledge of how to use AI systems is not only essential for experts. Digital skills for citizens are a prerequisite for fear-free and productive use of AI technologies and for social participation.

AI skills must therefore have their place in education and training in schools, in teaching and at universities. AI can support learners and teachers and help to make learning more effective and exciting. AI will also make parts of the knowledge and skills that are currently the focus of school education obsolete. There is therefore a need for a discussion about how the school system should respond to the changes brought about by AI.

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AI IN THE PUBLIC SECTOR

In many parts of public administration, from financial management to security, AI can help to optimize processes, e.g. through plausibility checks. AI can help to create new services for citizens. The public sector can promote the spread of AI and its use in the economy as early adopters and thus create benefits for citizens and companies, e.g. in e-government.

AI IN THE PUBLIC SECTOR

In many parts of public administration, from financial management to security, AI can help streamline operations, eg through plausibility checks. AI can help create new services for citizens. The public sector can promote the dissemination of AI and its use in business as first-time adopters, thus creating benefits for citizens and the economy, eg in e-government.

AI IN THE ECONOMY

AI will create new opportunities for product and process innovation in almost all industries of the business sector. However, new technologies often come with high costs for investment and new knowledge, which can pose a challenge for the use of AI in small and medium-sized enterprises.

In addition to knowledge of the technological fundamentals, AI also requires flexibility and the willingness to try new things. Promoting AI-based start-ups can be an effective means of promoting diffusion. Established companies that rely on AI may have to say goodbye to business models that have been successful in the past. Areas of action concern issues of standardization, data protection and access to data.

AI IN THE ECONOMY

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In addition to knowledge of the technological basics, AI requires flexibility and the willingness to try new things. The promotion of AI-based foundations can be an effective means of promoting diffusion. Established companies that rely on AI may have to abandon business models that have been successful in the past. Fields of action concern issues of standardization, data protection and access to data.

INFRASTRUCTURE FOR INDUSTRIAL LEADERSHIP POSITIONS

A high-quality digital infrastructure is an important prerequisite for the innovative use of AI. This includes a good data infrastructure, well-developed broadband connections and 5G networks as well as high-performance computer systems. This also includes infrastructure in the areas of transport, energy and a modern, interoperable healthcare system.

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SOCIETY, ETHICS AND LABOR MARKET

AI will have a major impact on the labor market and society. Various professions will change radically or even become redundant. The socially acceptable and value-oriented further development of AI is supported by a broad social discussion. Such a dialogue can dispel reservations that may stand in the way of the spread of AI and help to ensure its benefits for broad sections of the population. In addition to scientifically sound information, ethical questions and social principles must also be part of such a dialogue. Representatives from politics, civil society, science, business and the arts can make valuable contributions to this dialogue.

SOCIETY, ETHICS AND LABOR MARKET

AI will have a big impact on the labor market and society. Different professions will change radically or even become redundant. The socially responsible and value-oriented further development of AI will be supported by a broad societal discussion. Such a dialogue can invalidate reservations that may oppose the dissemination of AI and help to secure benefits for broad layers of the population. In addition to scientifically substantiated information, ethical questions and social principles must also be the content of such a dialogue. Political, civil society, science, business and art representatives can make essential contributions to this dialogue.

AI GOVERNANCE, SECURITY AND LAW

Legal uncertainty can delay the spread of AI, for example if there are ambiguities regarding data ownership, data protection in connection with AI applications in the cloud or in connection with autonomous driving.

To ensure that AI is widely used, politics must reduce this uncertainty. AI must be as safe, transparent and reliable as possible through clear rules for companies, the state and citizens. A stable regulatory framework can make a significant contribution to a positive investment climate for AI. This affects many areas of technology law - from data protection to product liability. National solo efforts and special regulations do not seem to be very effective due to the global nature of the technology. European and international cooperation plays a particularly important role in the governance of AI, for example in the emerging European Digital Single Market.

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